



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ammonic hydrate, crystallizes in prismatic needles; quite readily soluble in hot water, sparingly in cold. Under the microscope it crystallizes from hot aqueous solution in rhombic plates. It may be dried at 100° without decomposition. It gave on analysis, —

0.1210 grm. left on ignition 0.0556 grm. silver.

	Calculated for	Found.
	$\text{AgC}_4\text{N}_2\text{H}_3\text{O}_3$.	
Ag	45.95	45.95

There can be no doubt that this substance is identical with that obtained by Dessaignes* from creatinine, which was first recognized by Strecker† as methylparaban. Dessaignes gives no melting point, but the description given corresponds perfectly with the substance I have obtained; the only difference being that I find the substance quite readily soluble in ether, whereas he gives it as somewhat soluble only.

A consideration of the bearing of these facts upon the structure of uric acid I shall postpone until I have obtained further results.

II.—ON SOME OF THE SALTS OF METHYLURIC ACID, $\text{C}_6\text{H}_3(\text{CH}_3)\text{N}_4\text{O}_3$.

BY OSCAR R. JACKSON.

Presented, June 14, 1876.

THIS work was undertaken with the purpose of proving the basicity of methyluric acid. The acid was obtained by the method described by Prof. H. B. Hill, under whose direction the preparation and analyses of the salts were conducted.

Owing to the fact that all the dibasic salts absorb carbonic acid very readily when exposed to air, as is the case with the salts of uric acid, special means had to be taken to dry the salts in an atmosphere free from carbonic acid. For this purpose they were dried *in vacuo* over sulphuric acid, and a few pieces of potassic hydrate were also placed under the receiver when the dibasic salts were dried. For the determination of the water of crystallization, the salts were heated to

* Ann. Chem. u. Pharm. 97, 343.

† Ann. Chem. u. Pharm. 118, 164.

140° to 150° in a current of air; the air being first caused to pass through a series of six tubes, each $2\frac{1}{2}$ feet long; two being filled with solid potassic hydrate, and the remaining four with calcic chloride. The substance being weighed before and after heating, the water was estimated by the loss of weight. The bases were then estimated in the anhydrous salts by the methods given below.

Dipotassic methylurate, $K_2C_5H(CH_3)N_4O_3 \cdot 3H_2O$.

This salt was made by suspending about one gramme of the acid in ten or fifteen cubic centimetres of boiling water in a small flask, and then adding a solution of potassic hydrate in large excess over the amount necessary to dissolve the acid. The solution was then boiled for some time, and about 100 cc. of alcohol added. On the addition of the alcohol, the salt separates out in a flocculent form. The flask is then corked up, to avoid exposure to carbonic acid, and allowed to stand twenty-four hours. The precipitate is then filtered off rapidly by the Bunsen pump, washed with alcohol, and dried *in vacuo* over sulphuric acid and potassic hydrate.

This salt when dry is an amorphous flocculent substance, and is very soluble in hot water; but when a hot solution cools, the salt does not separate out, but becomes a gelatinous mass resembling glue. This salt absorbs carbonic acid very readily from the air. When carbonic acid is passed through a solution of this salt, the monopotassic salt is probably formed, though no precipitate falls.

The water of crystallization was determined by the method given above. For the determination of the potassium, the anhydrous salt was ignited in a platinum crucible; and, after the residue had been burned as white as possible, it was treated with a few drops of hydrochloric acid. The excess of hydrochloric acid was then driven off, and the crucible ignited gently to avoid decrepitation, and then finally heated to dull redness for a few seconds.

0.3700 grm. of salt dried <i>in vacuo</i> gave 0.0635 grm. H_2O	= 17.17 %
Calculated for $K_2C_5H(CH_3)N_4O_3 \cdot 3H_2O$	= 17.29 %

0.4974 grm. of dried salt gave 0.2367 grm. KCl ; K	= 24.95 %
Calculated for $K_2C_5H(CH_3)N_4O_3$	= 25.04 %

Monopotassic methylurate, $KC_5H_2(CH_3)N_4O_3 \cdot H_2O$.

This salt was made by suspending about one gramme of the acid in ten or fifteen centimetres of boiling water, and adding potassic carbon-

ate in slight excess over the calculated amount. The acid dissolves on the addition of the potassic carbonate with disengagement of carbonic acid. The solution was then boiled for some time, until the effervescence ceased, and precipitated with alcohol; allowed to stand twenty-four hours, filtered, washed with alcohol, and dried as in the case of the dipotassic salt.

This salt is quite like the dipotassic salt. It is very soluble in hot water, gelatinous on cooling, and is insoluble in alcohol.

The method of analysis was the same as for the dipotassic salt, with the exception that the potassium was estimated in the hydrous salt.

0.3161 grm. of salt dried *in vacuo* gave 0.0228 grm. H_2O = 7.21 %
 Calculated for $\text{KC}_5\text{H}_2(\text{CH}_3)\text{N}_4\text{O}_3 \cdot \text{H}_2\text{O}$ = 7.56 %

0.3766 grm. of salt dried *in vacuo* gave 0.1152 grm. KCl ; K = 16.01 %
 Calculated for $\text{KC}_5\text{H}_2(\text{CH}_3)\text{N}_4\text{O}_3 \cdot \text{H}_2\text{O}$ = 16.42 %

Disodic methylurate, $\text{Na}_2\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3 \cdot 3\text{H}_2\text{O}$.

This salt was made by dissolving the acid in an excess of sodic hydrate and precipitating with alcohol, exactly as in the case of the dipotassic salt, which it closely resembles.

The analysis was conducted in the same way as above.

0.6691 grm. of salt dried *in vacuo* gave 0.1287 grm. H_2O = 19.23 %
 Calculated for $\text{Na}_2\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3 \cdot 3\text{H}_2\text{O}$ = 19.28 %

0.4548 grm. dried salt gave 0.2304 grm. NaCl ; Na = 19.92 %
 Calculated for $\text{Na}_2\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3$ = 20.35 %

Monosodic methylurate, $\text{NaC}_5\text{H}_2(\text{CH}_3)\text{N}_4\text{O}_3 \cdot \text{H}_2\text{O}$.

This salt was made by adding, very carefully, a solution of Na_2SO_4 to a boiling-hot solution of monobaric methylurate until there is no further precipitate of baric sulphate. The solution was then filtered from the BaSO_4 , evaporated to a very small quantity, and then precipitated with a large amount of alcohol 100 to 150 cc.; allowed to stand twenty-four hours, filtered, washed with alcohol, and dried *in vacuo*. This salt does not seem to be quite as gelatinous as the rest, and is much more soluble in dilute alcohol.

In the analysis of this salt the water was determined as above, and the sodium by ignition of the anhydrous salt, and treated with a few drops of sulphuric acid.

0.1944 grm. of salt dried *in vacuo* gave 0.0150 grm. H_2O = 7.81 %
 Calculated for $\text{NaC}_5\text{H}_2(\text{CH}_3)\text{N}_4\text{O}_3 \cdot \text{H}_2\text{O}$ = 8.10 %

0.1799 grm. of dried salt gave 0.0613 grm. Na_2SO_4 ; Na = 11.00 %
 Calculated for $\text{NaC}_5\text{H}_2(\text{CH}_3)\text{N}_4\text{O}_3$ = 11.27 %

Dibasic methylurate, $\text{BaC}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3 \cdot 3\frac{1}{2}\text{H}_2\text{O}$.

This salt was made by dissolving one gr. of the acid in as little boiling water as possible in a small flask, and adding twenty-five cc. of cold saturated solution of baric hydrate. The solution was then boiled for some time, corked up, and allowed to stand. The salt separates out in very minute needles, clustered together in places, and of a slightly greenish tinge. The salt was collected on a filter, and washed rapidly with a very small quantity of cold water, and then dried *in vacuo*. The chief feature of this salt is, that it is the only one of the salts obtained which shows the slightest tendency to assume a crystal-line form. It is also the most insoluble of any of the salts.

The salt prepared in this way gave, in several analyses, too great a percentage of barium. It was found impossible to free it from the excess of baric hydrate by washing on account of the ready solubility of the salt.

The water was determined as before, and the barium by ignition of the anhydrous salt in a platinum crucible, and treatment with a little sulphuric acid. The excess of acid was driven off, and then the crucible heated for some time in a current of air to oxidize any sulphide which might have been formed.

1.2318 grm. salt dried *in vacuo* gave 0.1979 grm. H_2O = 16.06 %
 Calculated for $\text{BaC}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3 \cdot 3\frac{1}{2}\text{H}_2\text{O}$ = 16.57 %

0.4738 grm. dried salt gave 0.3656 grm. BaSO_4 ; Ba = 44.07 %
 Calculated for $\text{BaC}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3$ = 43.22 %

Monobasic methylurate, $\text{BaC}_5(\text{H}(\text{CH}_3)\text{N}_4\text{O}_3)_2 \cdot 4\text{H}_2\text{O}$.

For the preparation of this salt, about one gramme of the acid was suspended in boiling water, and baric carbonate added until no more would dissolve. The solution was then boiled for some time, and filtered from the undissolved baric carbonate, and precipitated by alcohol. On the addition of alcohol, it separates out as white powder. It is very soluble in hot water, and solidifies on cooling into a white jelly-like mass.

The analysis was made as in the case of the dibarium salt.

0.5073 grm. salt dried <i>in vacuo</i> gave 0.0614 grm. H_2O	= 12.10 %
Calculated for $\text{Ba}(\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3)_2 \cdot 4\text{H}_2\text{O}$	= 12.60 %

0.4472 grm. dried salt gave 0.2109 grm. BaSO_4 ; Ba	= 27.73 %
Calculated for $\text{Ba}(\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3)_2$	= 27.45 %

Monocalcic methylurate, $\text{Ca}(\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3)_2 \cdot 3\text{H}_2\text{O}$.

This salt was made from calcic carbonate in the same manner as the monobarium salt, except that it was found necessary to boil the acid with the carbonate for several hours, in order to ensure the complete conversion of the acid.

This salt has nearly the same properties as the monobarium salt. It is a grayish substance, very soluble in hot water, and gelatinizes on cooling.

The analysis was conducted as in the case of the barium salts.

0.2123 grm. salt dried <i>in vacuo</i> gave 0.0244 grm. H_2O	= 11.49 %
Calculated for $\text{Ca}(\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3)_2 \cdot 4\text{H}_2\text{O}$	= 11.89 %

0.1864 grm. of dried salt gave 0.0600 grm. CaSO_4 ; Ca	= 9.43 %
Calculated for $\text{Ca}(\text{C}_5\text{H}(\text{CH}_3)\text{N}_4\text{O}_3)_2$	= 9.95 %

A dicalcium salt has been obtained by the action of methyluric acid on calcic hydrate, but has not yet been analyzed.

The action of methyluric acid on plumbic carbonate was tried with expectation of obtaining a lead salt, but the reaction does not seem to work easily, for though carbonic acid is evolved, and sulphide of hydrogen gives a slight precipitate with the filtrate, still the salt which separates out on cooling does not seem to be homogeneous, and on analysis gives but a very small percentage of lead. It probably consists of the free acid with a small amount of lead salt.

We thus see that there are two distinct sets of salts, and it is evident that methyluric acid is dibasic, — a fact of considerable theoretical interest, inasmuch as uric acid only forms two sets of salts, and not without some bearing on the constitution of uric acid.

Before closing, I wish to express my sincere thanks to Prof. H. B. Hill for his valuable advice, and for the kind interest which he has taken in the progress of this work.